EOS Mission Support Network Performance Report

This is a monthly summary of EMSnet performance testing -- comparing the measured performance against the requirements. Currently using updated BAH requirements (Feb '03), including missions through 2006.

All results are reported on the web site:
http://netstats.eos.nasa.gov/performance/Net_Health/EMSnet_list.html.

Note the new web page URL!!!!

It shows MRTG-like graphs of the performance to various test sites, including thruput, RTT, packet loss, and hops, with 1 week, 2 month and 6 month graphs.
(The old URL will continue to work for a while too).

Highlights:

- Most test results were stable.
- Rating for US →NASDA dropped due to the incorporation of 4 ISTs for AMSR-E into the requirement. Note: this is possibly an excessive requirement.
- JPL EMSnet redesign is in progress

.Ratings:

Rating Categories:

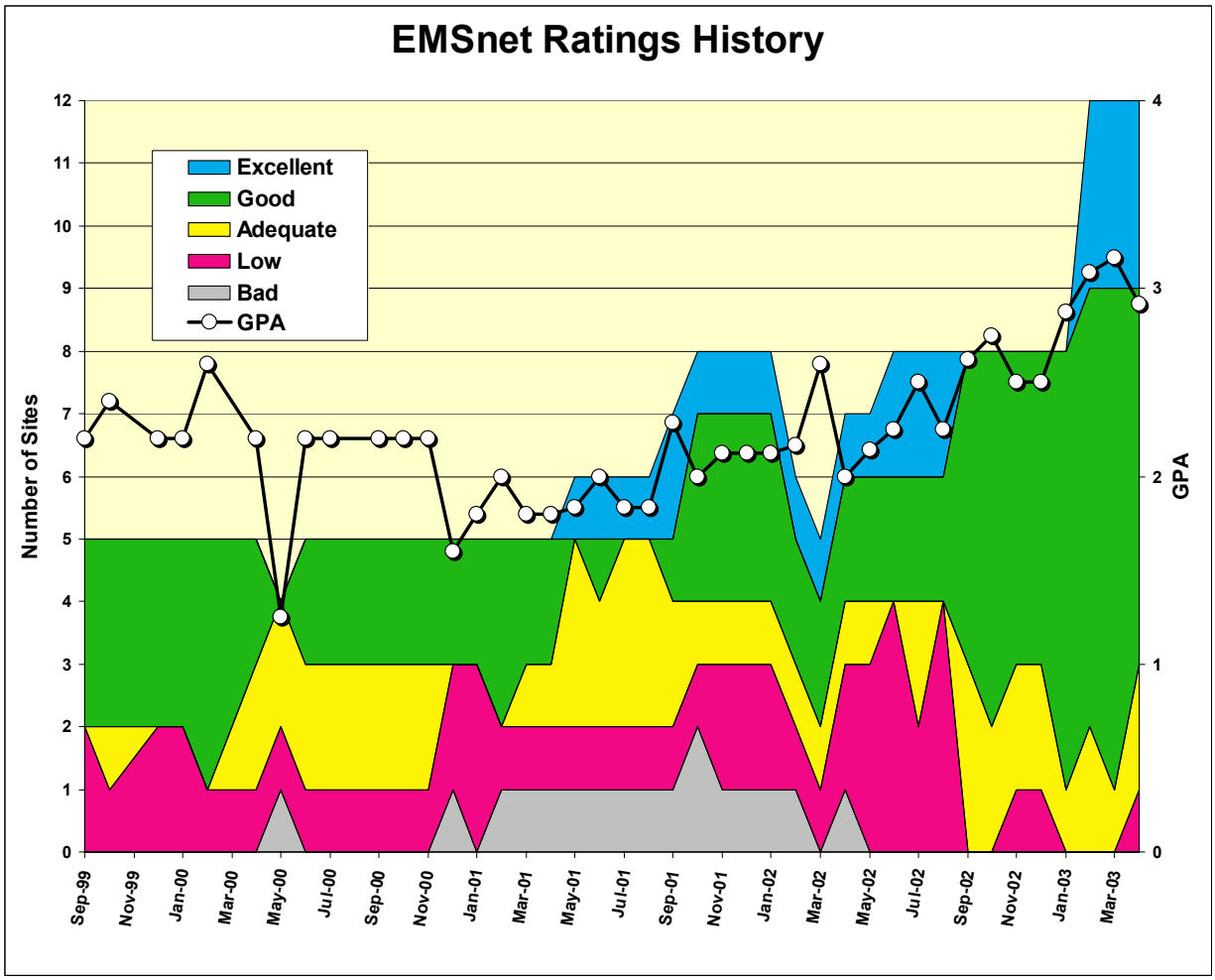
Excellent: **Total Kbps** > Requirement * 3
Good: 1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate: Requirement < **Total Kbps** < Requirement * 1.3
Low: **Total Kbps** < Requirement.
Bad: **Total Kbps** < Requirement / 3

Where Total Kbps = User Flow + iperf monthly average

Upgrades: ↑ **None**

Downgrades: ↓:
US → NASDA: Good → **Adequate**
NASDA → US: Good → **Low**

The chart below shows the number of sites in each classification since EMSnet testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



EMSnet Sites:

Network Requirements vs. Measured Performance

April 2003		Requirements (kbps)		Testing						
Source -> Destination	Team (s)	Current Dec-02	Future Oct-03	Source Node : Test Period	Avg User Flow kbps	Perf Avg kbps	Total Avg kbps	Current Status re Dec-02	Prev Stat	Current Status re Oct-03
ASF-> NOAA	ADEOS II	1864	1864	ASF->NESDIS: 29-Nov-02 - 30-Apr-03	279	2479	2757	GOOD	G	GOOD
GSFC->EDC	MODIS, LandSat	170741	216574	DOORS-EDCTest: 01-Mar-03 - 30-Apr-03	137769	49603	187372	Adequate	A	LOW
GSFC->ERSDAC	ASTER	664	664	GDAAC: 03-Jan-03 - 30-Apr-03	109	779	888	GOOD	G	GOOD
GSFC -> JPL	ASTER, QuikScat, MLS, etc.	1609	1300	CSAFS: 15-Aug-02 - 30-Apr-03	951	5797	6748	Excellent	E	Excellent
JPL -> GSFC	ADEOS II, AMSR, etc.	4863	4693	JPL -> GSFC: 13-Jan-03 - 30-Apr-03	243	9111	9353	GOOD	G	GOOD
LaRC -> JPL	TES	0	30585	LDAAC: 15-Aug-02 - 30-Apr-03	98	5908	6006	n/a	n/a	BAD
GSFC->LARC	CERES, MISR, MOPITT	45533	52664	GDAAC: 01-Jan-03 - 30-Apr-03	11113	58489	69601	GOOD	G	GOOD
LaRC -> GSFC	MODIS, TES	6777	44795	LDAAC --> GDAAC: 09-Sep-02 - 30-Apr-03	1742	24108	25849	Excellent	E	LOW
US ->NASDA	QuikScat, TRMM, AMSR	2856	2623	CSAFS: 23-Aug-02 - 30-Apr-03	423	1795	2218	LOW	G	LOW
NASDA->US	AMSR	1559	1559	NASDA->JPL-SEAPAC: 01-Mar-03 - 30-Apr-03	50	1963	2012	Adequate	G	Adequate
JPL -> NSIDC	AMSR	770	1540	JPL: 13-Jan-03 - 30-Apr-03	0	4138	4138	Excellent	E	GOOD
NSIDC->GSFC	MODIS, ICESAT, QuikScat	8313	8313	NSIDC -> GDAAC: 23-Oct-02 - 30-Apr-03	174	15716	15890	GOOD	G	GOOD
GSFC-> NSIDC	MODIS, ICESAT, QuikScat	32603	38234	GDAAC: 01-Mar-03 - 30-Apr-03	6033	58582	64615	GOOD	G	GOOD

Notes:
All flow requirements listed are the greater of inflow or outflow
Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II

***Criteria:**

Excellent	**Total Kbps** > Requirement * 3	
GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3	
Adequate	Requirement < **Total Kbps** < Requirement * 1.3	
LOW	**Total Kbps** < Requirement	
BAD	**Total Kbps** < Requirement / 3	

Ratings Summary

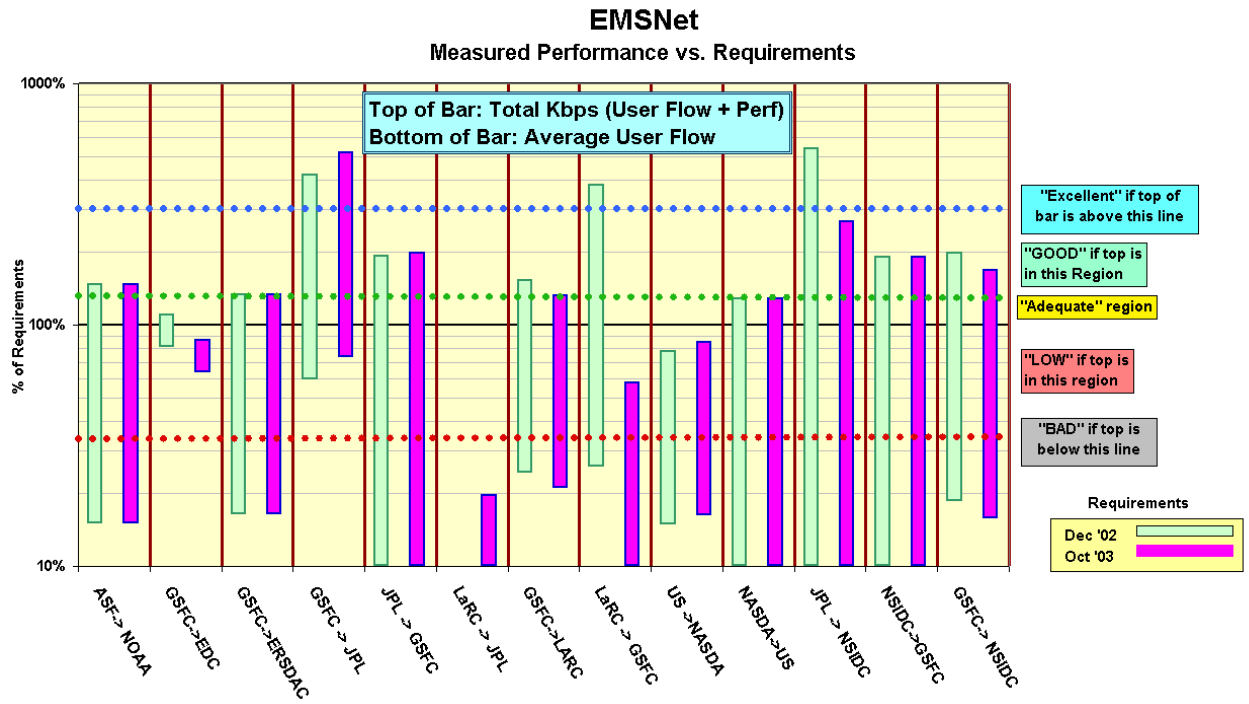
	Dec-02 Score	Dec-02 Prev	Oct-03 Score
Excellent	3	3	1
GOOD	6	8	7
Adequate	2	1	1
LOW	1	0	3
BAD	0	0	1
Total	12	12	13
GPA	2.92	3.17	2.31

Change History:

27-Sep-99	Original - TRMM, Terra, and QuikScat
19-Jan-01	Incorporated BAH requirements including additional missions
9-Apr-01	Updated BAH requirements
4-Jun-01	Added 50% contingency to BAH requirements
16-Nov-01	Added MRTG to Iperf, updated requirements, Revised criteria
2-Oct-02	Updated to revised BAH requirements
7-Mar-03	Updated Requirements, Added tests to GSFC, improved User flow calculation

Comparison of measured performance with Requirements:

This graph shows two bars for each source-destination pair. Each bar uses the same actual measured performance, but compares it to the requirements for two different times (Dec '02, and Oct. '03). Thus as the requirements increase, the same measured performance will be lower in comparison.



Note: this chart shows that the performance to most sites is remarkably close to requirements. In the past, some sites have had performance way above the requirements, others way below.

Also note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF ←→ CONUS:

Rating: Continued **Good**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/ASF-EMS.html

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	User Flow	TOTAL
ASF → NESDIS	2543	2479	713	279	2757
ASF → GSFC-CSAFS	2619	2348	1161		
ASF→ JPL-SEAPAC	2799	2613	1363		
GSFC-CSAFS → ASF	2766	2709	1232	49	

Requirements:

Source → Dest	FY	mbps	Rating
ASF → NESDIS	'03, '04	1.86	**Good**

Comments: The 2.76 mbps total from ASF → NOAA is very good for a 2 * T1 (3.1 mbps) circuit. Since this is more than 30% over the Dec '02 requirement, the rating is "Good".

There was a problem from JPL to ASF, which began as a slow degradation in January, after correction of serious problems from mid October '02 to Dec '02. The thruput was very noisy, even in the absence of user traffic. This problem was fixed in late March.

Also, testing from ASF to SEAPAC and NASDA recovered in April, after going down in March due to the ASF firewall.

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2) GSFC → EDC:

Rating: Continued **Adequate**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/EDC.html

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	TOTAL
DOORS → EDC DAAC	156.4	57.1	33.0	137.7	194.9
DOORS → EDC Test	99.4	49.6	31.5		
G-DAAC→ EDC DAAC	107.9	36.2	17.6		

Requirements:

Date	mbps	Rating
Dec '02	170.7	**Adequate**
Oct '03	216.6	**Low**

The three test cases above continue to show the effects of the DAAC firewalls: the test shown on the top row goes through the EDC firewall to the ECS DAAC. The next test has no firewalls in the path, just vBNS+, and the last test goes through both the GSFC and EDC firewalls. From these values, it does not appear that the EDC firewall has much of an effect on thruput, but the GSFC firewall does

This month the user flows were decreased about 12 mbps, but the corresponding thruput tests were a bit higher, with the total therefore almost the same. The combined MRTG + thruput is above the Dec '02 requirement, but not by a 30% margin, so the rating remains "Adequate". The total is also lower than the Oct '03 requirement, so that rating remains "Low".

3) JPL:

Ratings: GSFC → JPL: Continued **Excellent**
JPL → GSFC: Continued **Good**
LaRC → JPL (Oct '03): Continued **Bad**

Web Pages:

http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-SEAPAC.html
http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-PODAAC.html
http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-TES.html

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	TOTAL
GSFC-CSAFS → JPL-SEAPAC	6.09	5.80	3.64	0.95	6.75
LaRC DAAC → JPL-TES	6.02	5.91	4.01	0.02	5.93
GSFC-MTVS1 → JPL-PODAAC	6.00	5.73	4.57		
JPL-PODAAC→ GSFC DAAC	11.57	9.11	5.02		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → JPL combined	Dec '02	1.61	Excellent
GSFC → JPL combined	Oct '03	1.30	Excellent
JPL → GSFC combined	Dec '02	4.86	Good
LaRC DAAC → JPL-TES	Oct '03	30.6	Bad

The GSFC-JPL requirement above was revised in August '02 to include all flows on the GSFC-JPL circuit, including flows from LaRC and flows to NASDA and ASF. The rating is based on testing via EMSnet from CSAFS at GSFC to SEAPAC at JPL. Note that the user flow value above also includes these flows.

Performance on this circuit has been very stable since the BOP switchover on 15 August '02. With the revised combined requirement of 1.6 mbps, the rating remains "Excellent".

Performance from LDAAC to JPL-TES has also been very stable since it improved from 2.9 to 6.0 mbps on Aug 15, due to BOP. However, the new Oct. '03 requirement for this flow is 30 mbps. This is well above the current capability, which was not designed to accommodate this flow (the current route is via NSIDC). Accordingly, an NSR is in progress to provide a direct VC with increased capability.

The route from GDAAC to JPL-TES and JPL-PODAAC changed to EMSnet on 12 February '03 – it had been using NISN SIP since May 8 '02. GSFC to JPL-PODAAC performance testing is still sourced from MTVS1. Performance has been very steady at 6 mbps since the BOP upgrade on 15 August '02. Performance from the G-DAAC to PODAAC is very similar

Also now being tracked is the requirement from JPL to GSFC. It includes flows from NASDA and ASF which go via JPL, and includes GSFC and NOAA destinations. The combined Dec. '02 requirement is 4.86 mbps, and the thruput (9.11 mbps) is more than 30% above that, so the rating remains "Good". **Note, however, that this circuit is rated at only 7.5 mbps, so the performance measured appears to exceed the circuit parameters!**

4) NSIDC:

Ratings: GSFC → NSIDC: Continued **Good**
NSIDC → GSFC: Continued **Good**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/NSIDC-EMS.html

GSFC ←→ NSIDC Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	TOTAL
GSFC-DAAC → NSIDC	88.6	58.6	28.6	6.0	64.6
NSIDC → GSFC-DAAC	16.5	15.7	9.5	0.2	15.9

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → NSIDC	Dec '02	32.6	Good
GSFC → NSIDC	Oct '03	38.2	Good
NSIDC → GSFC	'03, '04	8.3	Good

Performance from GSFC to NSIDC and from NSIDC to GSFC remains steady, with the ratings for both FY '03 and '04 remaining "Good".

Other Testing:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	Requirement	Rating
JPL → NSIDC-SIDADS	5.76	4.14	3.09	1.54	Good
LDAAC - NSIDC	4.80	4.67	4.47	0.07	Excellent

Performance has been very steady from JPL since the Aug '02 BOP switchover, exceeding the modest requirement. Note: this requirement increased from 0.77 mbps last month.

Thruput from LDAAC to NSIDC has been steady at about 4.5 mbps since 28 November. The very low requirement produces a rating of "Excellent".

5) GSFC ←→ LaRC:

Ratings: GDAAC → LDAAC: Continued **Good**
LDAAC → GDAAC: Continued **Excellent**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/LARC.html

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	TOTAL
GDAAC → LDAAC	89.5	58.5	28.0	11.1	69.6
LDAAC → GDAAC	25.4	24.1	15.9	1.7	25.8

Requirements:

Source → Dest	Date	mbps	Rating
GDAAC → LDAAC	Dec '02	45.5	Good
GDAAC → LDAAC	Oct '03	52.7	Good
LDAAC → GDAAC	Dec '02	6.8	Excellent
LDAAC → GDAAC	Oct '03	44.8	Low

Performance has been very stable since the BOP switchover in August '02. The requirements from GSFC → LaRC increased in March from 37.7 mbps. The Dec. '02 and Oct. '03 rating remain "Good".

The LaRC → GSFC requirement is now tracked. While the current performance is "Excellent", by FY '04 it is planned to backhaul all LaRC science outflow via GSFC, greatly increasing this requirement. A circuit upgrade will be required to meet this future requirement.

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6) GSFC → ERSDAC:

Rating: Continued **Good**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/ERSDAC.html

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	User Flow	TOTAL
GSFC → ERSDAC	801	779	376	109	888

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'03, '04	664	Good

Thruput since June '02, using the 1 mbps ATM connection had been very stable (except for a problem period from 12 November '02 to 3 Jan '03). The user flow increased a little this month (was 89 kbps last month, and 57 kbps before that). The rating remains "Good".

7A) US → NASDA:

Rating: ↓ Good → **Low**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/NASDA-EMSnet.html

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	User Flow	TOTAL
GSFC-CSAFS → NASDA-EOC	2149	1795	502	423	2218
ASF → NASDA-EOC	2248	1919	517		

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	Dec '02	2856	Low
GSFC → NASDA	Oct '03	2623	Low

Performance steady -- about as expected for the 3 mbps ATM PVC (using multiple TCP streams to mitigate TCP window size limitation at NASDA). Results from ASF to NASDA were slightly better than from CSAFS. The requirements were increased this month to include 4 ISTs at NASDA for AMSR-E. Each IST has a requirement for 311 kbps, for a total increase of 1244 kbps. This increase in requirements drops the rating to "Low", even thought the performance was stable. It could be questioned whether NASDA intends to operate all four of the ISTs simultaneously, or whether some ISTs are backups, in which case the network reqauirements would be reduced to a value attainable with the current circuit.

7B) NASDA → US:

Rating: ↓ Good → **Adequate**

Web Pages: http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-SEAPAC.html
http://corn.eos.nasa.gov/performance/Net_Health/files/GSFC-SAFS.html

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	User Flow	TOTAL
NASDA-EOC → JPL-SEAPAC	2319	1963	1036	50	2012
NASDA-EOC → GSFC-CSAFS	1395	1247	589		

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → US	'02, '03	1559	Adequate

Performance continues stable on the new circuit. A slight drop (less than 1 %) in performance this month (total was 2027 last month) drops the total just below 130% of the requirement, dropping the rating to "Adequate".

Note: NASDA has not yet implemented testing with multiple tcp streams. So performance to GSFC is limited by the TCP window size on NASDA's test machine, in conjunction with the long RTT. Therefore, in order to reflect the actual capability of network, the rating is derived from testing from NASDA to JPL. This test uses the same Trans-Pacific circuit, but has a shorter RTT, so will not be as severely limited by the TCP window size. The Trans-Pacific circuit connects into the higher speed domestic EMSnet at JPL, which is not expected to be the limiting factor.